

# Jason Locasale

## Web Bio

### Information

### Biography

#### Biographical Statement

**Jason W. Locasale, Ph.D.** is an Assistant Professor in the Division of Nutritional Sciences at Cornell University. He graduated from Rutgers University, Summa Cum Laude with a dual degree in Chemistry and Physics. He received his Ph.D. at the Massachusetts Institute of Technology in Biological Engineering. He then studied metabolism at Harvard Medical School where he worked as an American Cancer Society postdoctoral fellow and then later as an Instructor on the faculty.

Dr. Locasale's research focuses on understanding metabolism in cell growth, cancer pathogenesis and therapeutic intervention. His efforts have focused on understanding the Warburg Effect – the observation that tumor cells process glucose through fermentation even when oxygen is abundant for respiration. He has defined the mechanistic principles that lead to the Warburg Effect and is now investigating its downstream consequences on cellular physiology. He is currently translating this knowledge to develop biomarkers of agents that affect glucose metabolism in cancer. As a postdoctoral fellow, Dr. Locasale made the seminal discovery that a major pathway utilized by glucose-metabolizing cancer cells involved the diversion of glycolytic flux into one-carbon metabolism through de novo serine and glycine metabolism. Dr. Locasale is currently pursuing the role this pathway in disease pathogenesis and cell transformation and this work has led him to study the interplay between metabolism, signal transduction, and epigenetics. At the core of this effort lies the utilization of computational modeling and mass spectrometry-based metabolomics. Together this systems biology approach combines these tools with an integration of genetics, biochemistry, and cell biology.

He has authored over 48 publications and has authored numerous textbooks and patents.

### Teaching

#### Teaching and Advising Statement

My mentoring philosophy centers around creating an interdisciplinary environment where biologists, chemists and engineers integrate their skill-sets to address pressing biomedical problems.

With this multidisciplinary bent in mind, I have taught guest lectures throughout

the university in biology, chemistry, and biomedical courses. I teach metabolism in the Introduction to Human Biochemistry course. I also teach a clinical nutrition laboratory course.

## **Professional**

## **Research**

### **Current Research Activities**

Our research focuses on fundamental issues of cell growth and development as they relate to human disease and therapeutic intervention. We direct these efforts toward understanding human cancer as a disease of uncontrolled cell growth and development. This direction has also led to us to study problems in stem cell biology and cell fate determination. A common theme within this biology is a rewiring of metabolism to support and drive these processes. We strive to understand this altered metabolism as well as the nature of its normal counterpart. At the core of this effort lies the utilization of computational modeling and high throughput technologies such as mass spectrometry-based metabolomics. We define our systems biology approach through combining these tools with an integration of genetics, biochemistry, and cell biology. Investing such effort we believe has the potential to fundamentally alter our understanding of disease biology and lead to innovative therapies.

Current subjects of interest include:

- The Warburg Effect and Cancer Cell Metabolism
- serine, glycine and one carbon metabolism in cancer
- Metabolic Signal Transduction
- Metabolic Control of Epigenetics and Cell Fate
- Mass Spectrometry and Metabolomics
- Computational Techniques for Interpreting Biochemical Networks and Pathway Dynamics

## **Extension**

## **Education**

### **Education**

Ph.D., 2008 - Massachusetts Institute of Technology, Biological Engineering

B.A., 2003 - Rutgers University, Chemistry, Physics

## **Courses**

### **Courses Taught**

Fall 2014                      Cornell University              BioMG 4370: Cell Proliferation,  
Senescence, & Death (Guest Lecture, Cancer Metabolism section)

Fall 2014                      Cornell University              Nutritional Sciences 3320 – Methods  
in Nutritional Sciences (~70 students 3 credits, Full Responsibility)

Fall 2014                      Cornell University              Nutritional Sciences 3200 –  
Introduction to Human Biochemistry (~120 students 4 credits, Responsible for  
Metabolism Unit)

Spring 2014                      Cornell University              Nutritional Sciences 3310 -  
Physiological and Biochemical Basis of Human Nutrition, Guest Lecturer

Spring 2014                      Cornell University              Nutritional Sciences 6320 –  
Regulation of Macronutrient Metabolism, Guest Lecturer

## Websites

### Related Websites

<http://jlocasale.human.cornell.edu>

## Administration

## Publications

### Selected Publications

Mehrmohamadi, M., Liu, X., Shestov, A. A., and Locasale, JW. “Characterization of the Usage of the Serine Metabolic Network in Human Cancer.” *Cell Reports*. 9 (2014) 1507-1519

Huang L, Kim D, Liu X, Myers CR, **Locasale JW**. “Estimating Relative Changes of Metabolic Fluxes” **PLoS Comput Biol**. 2014 Nov 20;10(11):e1003958.

Shestov AA, Liu X, Ser Z, Cluntun AA, Hung YP, Huang L, Kim D, Le A, Yellen G, Albeck JG, **Locasale JW**. “Quantitative determinants of aerobic glycolysis identify flux through the enzyme GAPDH as a limiting step.” **Elife**. 2014 Jul 9:e03342. doi: 10.7554/eLife.03342.

Liu X, Ser Z, **Locasale JW**. “Development and Quantitative Evaluation of a High-Resolution Metabolomics Technology.” **Anal Chem**. 2014 Jan 28.

Locasale JW “Serine glycine and one-carbon units-cancer metabolism in full circle” *Nat Rev Cancer*. 2013 Aug;13(8):572-83.

